

## Contents

|   |           |
|---|-----------|
| <b>01 - Self-diagnosis . . . . .</b>  | <b>1</b>  |
| 1 <b>Self-odiagnosis . . . . .</b>  | <b>1</b>  |
| 1.1    Self-odiagnosis . . . . .  | 1         |
| 1.2    Function . . . . .   | 1         |
| 1.3    Technical data of self-diagnosis . . . . .   | 1         |
| 1.4    Connecting fault reader V.A.G 1551 and selecting engine electronics control unit . . . . . | 2         |
| 1.5    Interrogating and erasing fault memory . . . . .   | 4         |
| 1.6    Fault table . . . . .  | 5         |
| 1.7    Final control diagnosis . . . . .  | 18        |
| 1.8    Performing basic setting of engine . . . . .   | 20        |
| 1.9    Coding Simos control unit . . . . .  | 20        |
| 1.10   Reading measured value block . . . . .   | 21        |
| 1.11   Display Group overview with test table . . . . .   | 22        |
| 1.12   Reading measured value block: Display Groups 00 (block of ten) to 10 . . . . .             | 25        |
| 1.13   Reading measured value block: Display Groups 11 to 99 . . . . .                            | 32        |
| <b>24 - Mixture preparation, Injection . . . . .</b>  | <b>39</b> |
| 1 <b>Servicing Simos injection system . . . . .</b>   | <b>39</b> |
| 1.1    Servicing Simos injection system . . . . .   | 39        |
| 1.2    Safety precautions . . . . .   | 39        |
| 1.3    Rules for cleanliness . . . . .  | 39        |
| 1.4    Technical data . . . . .   | 39        |
| 1.5    Fitting locations overview . . . . .   | 40        |
| 1.6    Wiring and component check with test box V.A.G 1598/22 . . . . .                           | 43        |
| 1.7    Replacing engine control unit . . . . .  | 43        |
| 1.8    Testing idling speed . . . . .   | 45        |
| 1.9    Testing fuel pressure regulator and holding pressure . . . . .                             | 46        |
| 1.10   Testing injectors . . . . .  | 48        |
| 1.11   Testing injection quantity, leak tightness and spray pattern of injectors . . . . .        | 50        |
| 1.12   Testing fuel pump relay and activation . . . . .   | 52        |
| 1.13   Testing air mass meter (vehicles up to model year 1998) . . . . .                          | 54        |
| 1.14   Testing air mass meter (vehicles as of model year 1998) . . . . .                          | 56        |
| 1.15   Testing intake air system for leaks (unmetered air) . . . . .                              | 58        |
| 2 <b>Testing lambda control . . . . .</b>   | <b>59</b> |
| 2.1    Testing lambda control . . . . .   | 59        |
| 2.2    Poor performance after cold start . . . . .  | 60        |
| 2.3    Testing operation . . . . .  | 61        |
| 2.4    Testing lambda probe heating . . . . .   | 63        |
| 2.5    Testing lambda probe signal wiring and activation . . . . .                                | 64        |
| 2.6    Removing and installing lambda probe . . . . .   | 65        |
| 3 <b>Testing fuel tank breather system . . . . .</b>  | <b>66</b> |
| 3.1    Testing fuel tank breather system . . . . .  | 66        |
| 3.2    Testing solenoid valve 1 for activated carbon filter . . . . .                             | 66        |
| 4 <b>Testing throttle valve control unit . . . . .</b>  | <b>68</b> |
| 4.1    Testing throttle valve control unit . . . . .  | 68        |
| 4.2    Vehicles up to model year 1998 . . . . .   | 68        |
| 4.3    Adaptation of throttle valve control unit . . . . .  | 68        |
| 4.4    Testing idling switch . . . . .  | 70        |
| 4.5    Testing throttle valve positioner sender and throttle valve potentiometer . . . . .        | 71        |
| 4.6    Testing throttle valve control unit (vehicles as of model year 1998) . . . . .             | 73        |
| 5 <b>Testing intake manifold changeover function . . . . .</b>                                    | <b>80</b> |
| 5.1    Testing intake manifold changeover function . . . . .                                      | 80        |
| 5.2    Testing operation . . . . .  | 80        |

|           |  |           |
|-----------|--|-----------|
| 5.3       | Testing vacuum system . . . . .  | 80        |
| 5.4       | Testing intake manifold changeover valve . . . . .                               | 81        |
| 5.5       | Testing activation of intake manifold changeover valve . . . . .                 | 82        |
| <b>6</b>  | <b>Testing auxiliary signals . . . . .</b>                                       | <b>83</b> |
| 6.1       | Testing auxiliary signals . . . . .  | 83        |
| 6.2       | Testing air conditioner compressor shut-off . . . . .                            | 83        |
| 6.3       | Testing engine speed adaptation when air conditioner cuts in . . . . .           | 85        |
| 6.4       | Checking selector lever position on automatic gearbox . . . . .                  | 86        |
| 6.5       | Testing starter signal . . . . .   | 87        |
| 6.6       | Testing engine speed signal . . . . .  | 88        |
| 6.7       | Testing throttle valve position . . . . .  | 88        |
| 6.8       | Testing road speed signal . . . . .  | 89        |
| 6.9       | Testing gearshift signal when changing gear . . . . .                            | 90        |
| 6.10      | Testing signal from clutch pedal switch . . . . .                                | 91        |
| 6.11      | Testing signal from power steering pressure switch . . . . .                     | 92        |
| 6.12      | Testing data exchange between engine/ABS/gearbox control unit . . . . .          | 94        |
| <b>28</b> | <b>- Ignition system . . . . .</b>   | <b>95</b> |
| <b>1</b>  | <b>Testing ignition system . . . . .</b>   | <b>95</b> |
| 1.1       | Testing ignition system . . . . .  | 95        |
| 1.2       | Safety precautions . . . . .   | 95        |
| 1.3       | Technical data for ignition system . . . . .                                     | 95        |
| 1.4       | Identification of ignition connections on ignition coil . . . . .                | 96        |
| 1.5       | Testing twin-spark ignition system with two ignition coils . . . . .             | 96        |
| 1.6       | Testing intake air temperature sender (vehicles up to model year 1998) . . . . . | 98        |
| 1.7       | Testing intake air temperature sender (vehicles as of model year 1998) . . . . . | 100       |
| 1.8       | Testing engine speed sender . . . . .  | 102       |
| 1.9       | Testing coolant temperature sender . . . . .                                     | 103       |
| 1.10      | Testing control unit voltage supply . . . . .                                    | 105       |
| 1.11      | Testing knock sensor . . . . .   | 107       |
| 1.12      | Testing Hall sender . . . . .  | 109       |